

Allowing the exclusion of a liquid fuel produced by inorganic agency, he considers that "contemporary vegetation constitutes the only alternative to bituminous mineral deposits as a source of motor spirit, and it would seem that it must eventually supply (as alcohol) a large proportion of the world's requirements." To-day it is a question of the comparative cost of alcohol and petroleum spirit, and alcohol is at a serious disadvantage. In concluding his first chapter Dr. Monier-Williams cogently observes that "the balance of evidence certainly favours the view that before many years have elapsed the supply of petrol will be permanently unequal to the demand, and that power alcohol, considered from the standpoint of a supplementary and not necessarily competitive fuel, has an undoubted future before it."

The many problems associated with the economic production of fuel alcohol have received a great deal of attention, and the author has given a most complete account of the chemical and economic questions involved. In his later chapters he gives very full information on the results which have been obtained in practice with alcohol, and fuel mixtures containing it, and particular mention should be made of the excellent chapter on the chemical and physical properties of alcohol from the motor fuel standpoint. Here are included the important results which have recently been obtained by Ricardo, Tizard and Pye, and Ormandy.

One of the outstanding problems in connexion with fuel alcohol must be the bearing of excise regulations on its production, and the associated question of denaturing. When duty-free denatured alcohol was legalised in 1855 the duty was only 12s. per bulk gallon; to-day it is 6l. 3s. 3d. per gallon of 95 per cent. alcohol. To protect the revenue many onerous conditions have to be applied to production, and these necessarily are reflected in the costs, but some relaxation has already been sanctioned since 1921. It is now possible to import power alcohol as bulk cargo at certain ports, denature it in bond with at least 25 per cent. of petrol, benzol, or other approved substance, and to distribute the spirit without further restriction for power purposes alone. Dr. Monier-Williams deals very fully with these questions of excise supervision and denaturation, but concludes, after summarising the ideal requirements of a denaturant, that no substance has yet been found which fulfils satisfactorily all these conditions.

Whether "Power Alcohol" is considered from the point of view of the chemist, the engineer, or the general reader, it gives a complete and well-balanced consideration to all the problems associated with the production and utilisation. Sooner or later alcohol

seems bound to play no small part in our means of transport, but above all it is necessary to-day to maintain a proper sense of proportion, and this Dr. Monier-Williams may justly claim to have preserved. Enthusiastic advocates of a new development so often fail to recognise economic limitations.

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### Chemistry and Life.

*La Chimie et la Vie.* By Georges Bohn and Dr. Anna Drzewina. (Bibliothèque de Philosophie scientifique.) Pp. 275. (Paris: Ernest Flammarion, 1920.) Price 7.50 frs. net.

BEYOND a short chapter with general statements concerning colloids, nucleoproteids and lipoids, and a chapter insisting upon the specificity of the chemistry of living animals and plants, chemistry plays no more part in the arguments of the authors of "*La Chimie et la Vie*" than many other sciences. The authors do not deal with pure chemistry, but with chemical physics—the object of which is to determine the influence exerted by physical conditions such as pressure, temperature and concentration of solutions on the progress or change of direction of chemical reactions. They object to the tendency to localise the various properties of plants and animals to particular chemical substances, and suggest that ferments, hormones, antibodies, etc., may not be specific substances so numerous and varied as the effects they produce; but they may be, on the contrary, various methods of activity of a limited number of substances resulting for the most part from the disintegration of living matter.

The main thesis of the book shows how insolubly bound up with one another are all the various branches of biological science. Discussion centres around recent work from practically every branch—chemistry, physical chemistry, zoology, botany, physiology, psychology, general biology, cytology, embryology, medicine, serology. The authors show how fruitful has been the introduction of chemistry to the study of phenomena of life and to what degree chemical physics has restored interest in and revived problems of biology. Some of their own work is recorded briefly. They describe how a double Hydra can be produced from a single Hydra by temporarily depriving the organism of oxygen, and how the symmetry of the *Stauridium* is altered by a simple change of environment.

The authors consider that the law of van't Hoff and Arrhenius may be applied to vital actions—development of the egg, reproduction, respiration, rhythm of the heart, and growth—and that the "law of reciprocal phenomena" holds for sleep, secretion, movement

and growth. They also attempt to establish a parallelism between form and movement, considering that the same factors acting through the same mechanisms are concerned with both. In the origin of form and in the origin of movement, physics and geometry are working in unison with chemistry.

Immunity, Abderhalden's "ferments of defence," anaphylaxis, agglutinins, hæmolysins, precipitins, the secretions of the interstitial glands of the reproductive organs, and hormones in general receive attention. Interesting experiments of tropisms, of fertilisation by chemical means, of experimental parthenogenesis, and of plant grafting, extend the scope of the book. The authors consider that the substances which kill are at the same time the substances which give life; thus, a tumour is submitted to the same physico-chemical determination as a developing organ.

The attempt to co-ordinate in a readable and instructive form the recent discoveries of biological interest is certainly successful, and the book is inexpensively though well arranged.

### Aristotle in English.

*The Works of Aristotle translated into English. De Caelo*, by J. L. Stocks; *De Generatione et Corruptione*, by Harold H. Joachim. (Oxford: Clarendon Press, 1922.) 10s. net.

THE great Oxford version of Aristotle could scarcely have begun to deal with that philosopher's physics and cosmology at a more opportune time than the present. It is only a year or two since Prof. Whitehead, speaking with all the authority that belongs to his utterances on such a subject, warned us that the first explicit beginnings of the "bifurcation" which has infected nearly all subsequent philosophising about Nature and natural science, are explicit in Aristotle, and that the duty of the *Naturphilosoph* of the present day is to put himself back at the Pythagorean standpoint represented by Plato's "Timæus" and study the "passage" of nature with a mind freed from the prejudices begotten of a substance-attribute metaphysic.

This weighty modern endorsement of Bacon's old complaint that Aristotle corrupted natural science at its sources by his "dialectic," must have set many who know little Greek wishing to have the means of knowing more accurately than can be known from modern summaries exactly what the Aristotelian interpretation of Nature was. The translation of the "De Caelo" by Mr. J. L. Stocks and of the "De Generatione" by Prof. Joachim comes very opportunely to meet the need, so far as Aristotle's astronomical and physical doctrines are concerned. It is to be hoped that we

shall not have to wait much longer for the versions of the "Physics," the treatise which expounds the Aristotelian mechanics of the universe, and the "Meteorologica," which deals with the "sublunary" department of cosmology.

The University of Oxford may be highly complimented on producing an English version of the two historically very important works before us, which may be taken by all but specialist scholars as equivalent to the original text. In constituting the actual Greek text, both translators have done excellent work in removing a large number of the singularly infelicitous alterations made by Prantl, the editor of the Teubner editions. Mr. Stocks has given a very generous amount of annotation to the explanation of his divergencies from Prantl; Prof. Joachim, having recently published his own recension of the "De Generatione," naturally makes his version avowedly from that text, and thus escapes the necessity of critical notes. It is perhaps a pity, in view of the appeal his version should make to many who are scarcely likely to possess his text and commentary, that he has not recorded quite briefly at least the more important of his differences from one of the standard texts, *e.g.* Bekker's. Of course it is inevitable that the fuller and more argumentative annotations of Mr. Stocks should at times require him to take sides on disputable points of reading or exegesis, and he himself would, no doubt, be the first to admit that appreciation of the value of his work does not imply agreement with all his decisions on such issues. To agree or disagree in detail would only be possible after a special minute study of Mr. Stocks's notes in conjunction with the Aristotelian text and the commentary of Simplicius.

We note that on one very important point the exact meaning of the original seems to have been misconceived. We believe it can be made clear that the kind of motion of the earth stated in "De Caelo," ii. 293 b 30 ff., to be spoken of by Plato in the "Timæus," is not "rolling" of any kind. If that had been meant, Aristotle would not have been so careful to say that the "Timæus" speaks of something different, "motion at the centre." It is clear also that axial rotation cannot be meant, for reasons into which space will not permit us to enter. The poetical word used in the "Timæus" and repeated by Aristotle (*ἡλεκσταί*) appears properly to describe "to-and-fro" motion, "oscillation," or "excursion" about a mean position. If we suppose that Aristotle knew, as he could scarcely help knowing, the correct interpretation of the Platonic phrase, we see at once why he is so careful to distinguish this movement of the earth "to and fro" about "the middle" from all theories of movement "round the middle." The point is important, because, in speaking